

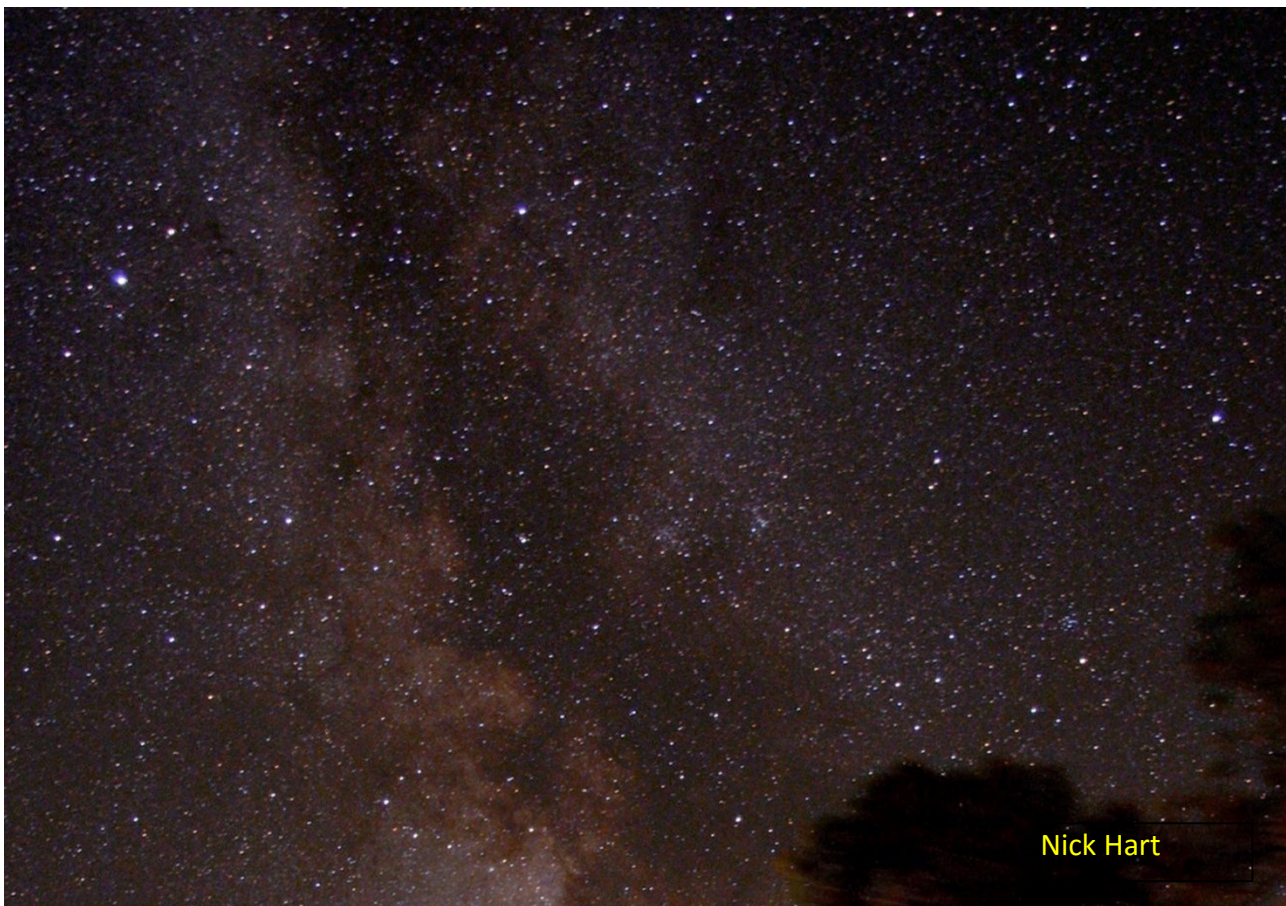


Lighting Guidelines

This good lighting guidance has been compiled by the Commission for Dark Skies

www.britastro.org/dark-skies

Efficient and environmentally sensitive lighting benefits wildlife, lessens harmful effects on human health, saves energy and money, slows climate change, means better safety and security and enhances our view of the inspiring night sky.



Contact the Commission for Dark Skies <http://www.britastro.org/dark-skies>

Summary - advice for efficient lighting

- Lights should shine only **where** needed
 - With the exception of guidance lights (e.g. aircraft runways, lighthouses), lights should shine downwards, towards the target. Uplighting should be avoided wherever possible. Buildings can be floodlit without light spill using modern, easily directable lights.
 - Lights should be shielded from shining into neighbouring homes, to avoid causing nuisance and the risk of a range of health problems
- Lights should shine only **when** needed
 - Lighting should be minimised at night. Evidence from local authorities shows that midnight streetlight switch-offs generally have no effect on accident rates and actually decrease crime. The UK's unlit villages are not crime hotspots!
- These guidelines should be applied **everywhere**
 - Poorly directed lighting in either urban or rural locations will have an impact visible for great distances.
 - Wasted light is wasted money - we spend many millions of pounds annually lighting up bats, owls and the bases of clouds.
- Apply the Earth Charter precautionary principle* **avoiding environmental harm**
 - Respect biodiversity - unnecessary lighting has a negative impact on nocturnal wildlife
 - Any white lighting should be warm white (colour temperature 3000k as a maximum) in order to protect wildlife, human health and dark skies

** The Earth Charter is a global consensus statement of values and principles for a sustainable future and has been adopted by many international organisations. Section II.6 states 'Preventing harm is the best method of environmental protection and, when knowledge is limited, apply a precautionary approach'.*



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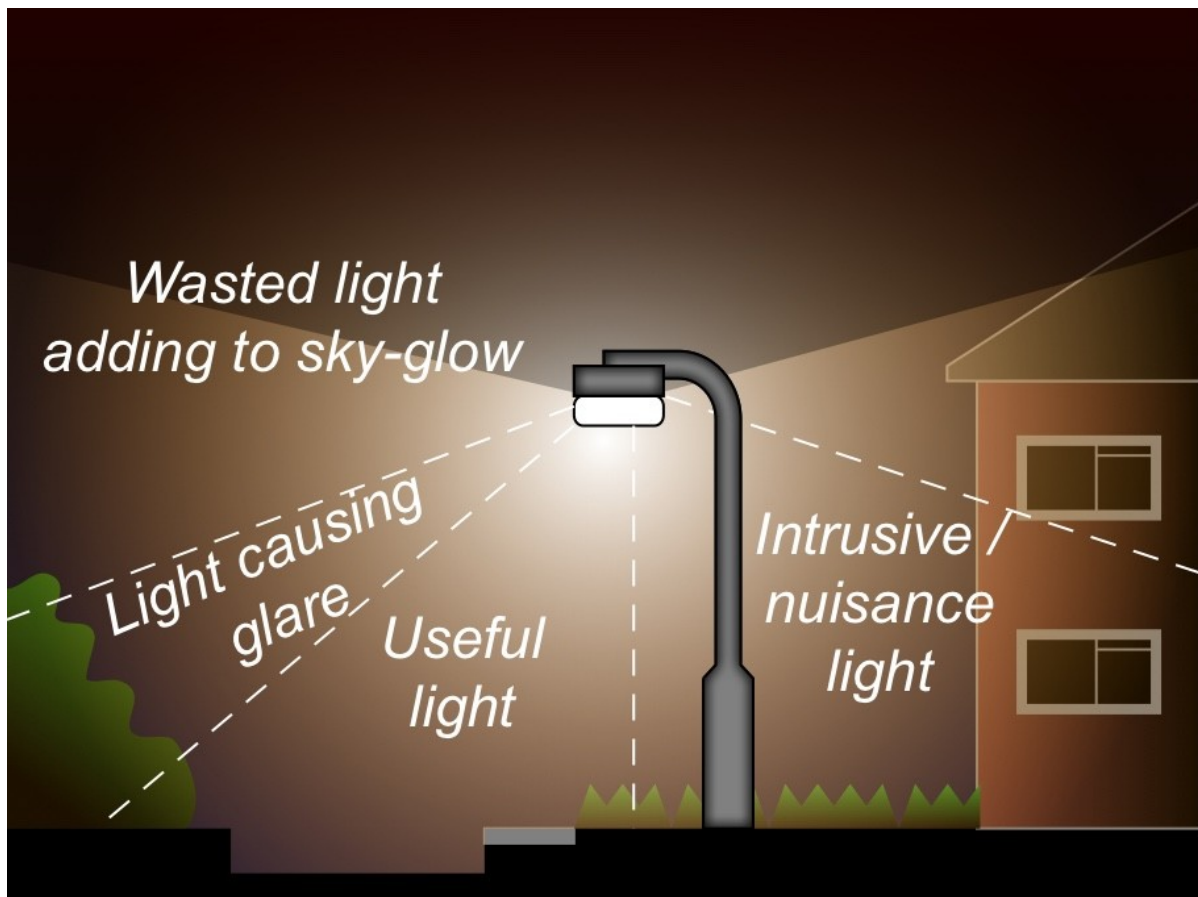
Poor Street Lighting

Poorly directed street lighting is a main contributor to light pollution, shining into people's homes and into the sky, causing the orange/grey halo (sky-glow) that hangs over urban areas and can be seen far away in the countryside.



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Only sharp cut-off downward-pointing lights should be used for lighting streets. These provide excellent spread along the street, and prevent light being wasted into the sky. Because they are better directed, it is often the case that fewer such lights are required than is the case with older types. The effects of non cut-off street lights are illustrated below.



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Good Street Lighting

Street lights should be designed to prevent light spilling:

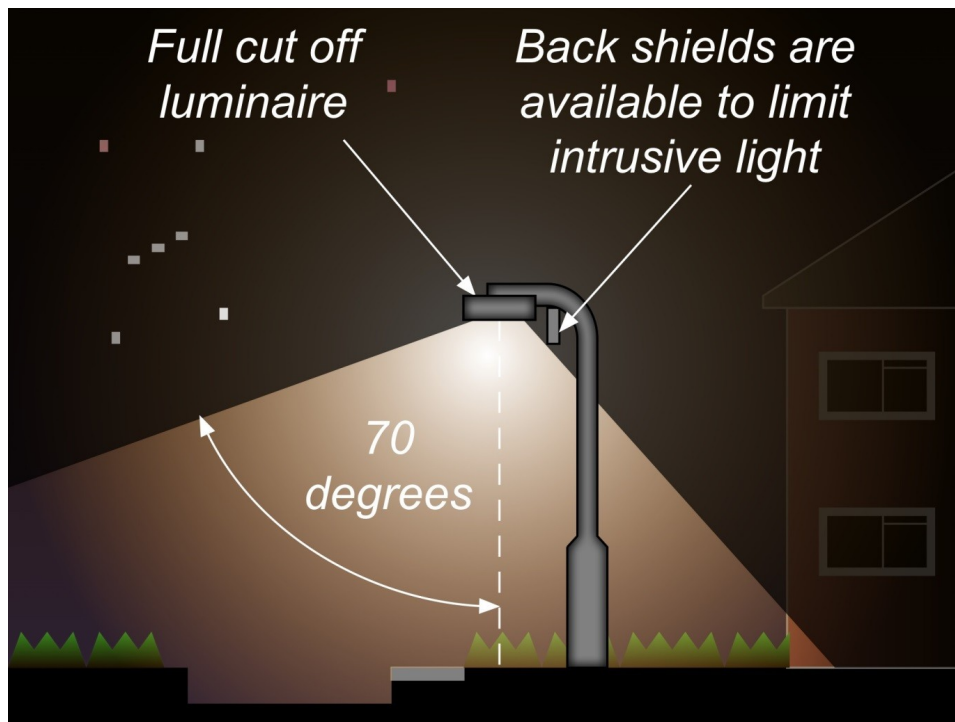
- into people's homes and properties
- above 70 degrees from the vertical

Street lights should be dimmable or off after midnight, when few (if any) cars or people are around. New remote-control technology allows modern lights to be run at lower power.



Trials have shown that energy-saving dimming (to over 30%) is hardly noticed by residents.

Below: Typical well directed full cut-off street lighting, with shields.



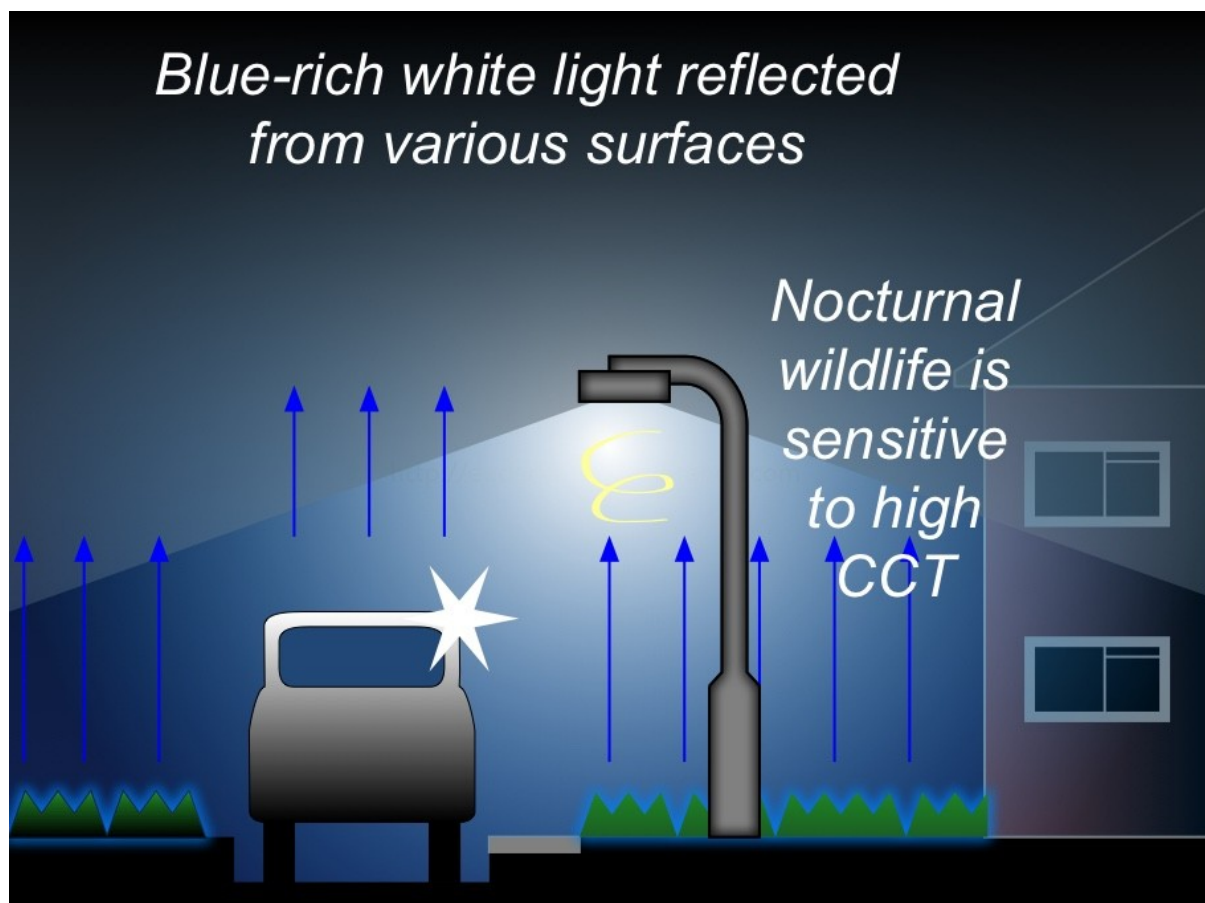
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Blue-rich white lighting

White light comprises all colours of the spectrum, from violet-blue (380-495nm) to red (620-750nm). The proportion of blue in the white light mix is quantified by the Correlated Colour Temperature (CCT) index; higher CCT equals more blue light relative to other colours.

The rapid and widespread introduction worldwide of blue-rich white lighting (principally LEDs) is causing great concern among environmentalists and astronomers. New and existing white-light sources are often far too bright for the lighting task and can have high colour temperatures in excess of 3000K. This harsh blue-white light reflects from surfaces and scatters high into the atmosphere. Even though the lights may be downward directed, they can still cause sky-glow and environmental damage through reflected light and CCT above 3000K. People often complain about harsh white road lights and prefer lower-CCT warm white or amber LED colours.

To avoid negative effects, all exterior lights should have a colour temperature less than 3000K as a default specification. Exceptions must be justified.



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Home floodlighting

Many of the new LED floodlights are very inefficient, casting light over a wide area, not just where it is required.

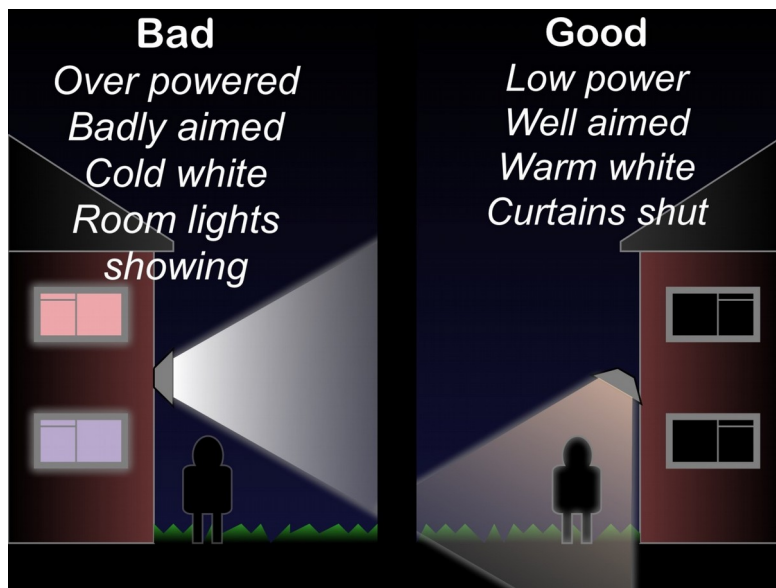


Floodlights on roadway on industrial premises: no light control, dazzles drivers and pedestrians, and sends nearly half its output into the sky. Photo: Bob Mizon

Use only floodlighting that has sensors to turn it off when not needed, and which lights only where needed. This will improve neighbours' well-being, avoid glare to pedestrians and traffic, and make wrongdoers more visible.



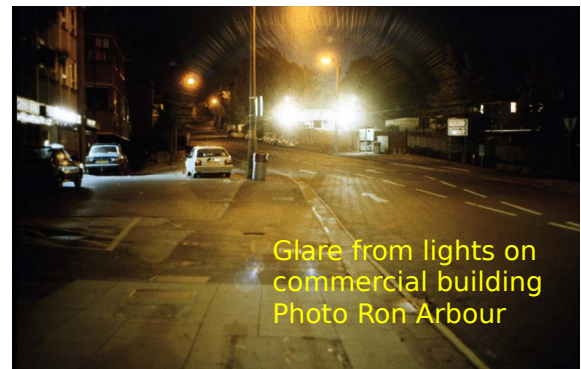
According to the UK Government crime-prevention website, much floodlighting is "...unfortunate, as in many locations it is inappropriately installed and other forms of lighting could make for a better choice". Poorly aimed floodlighting has been implicated in fatal accidents caused by glare.



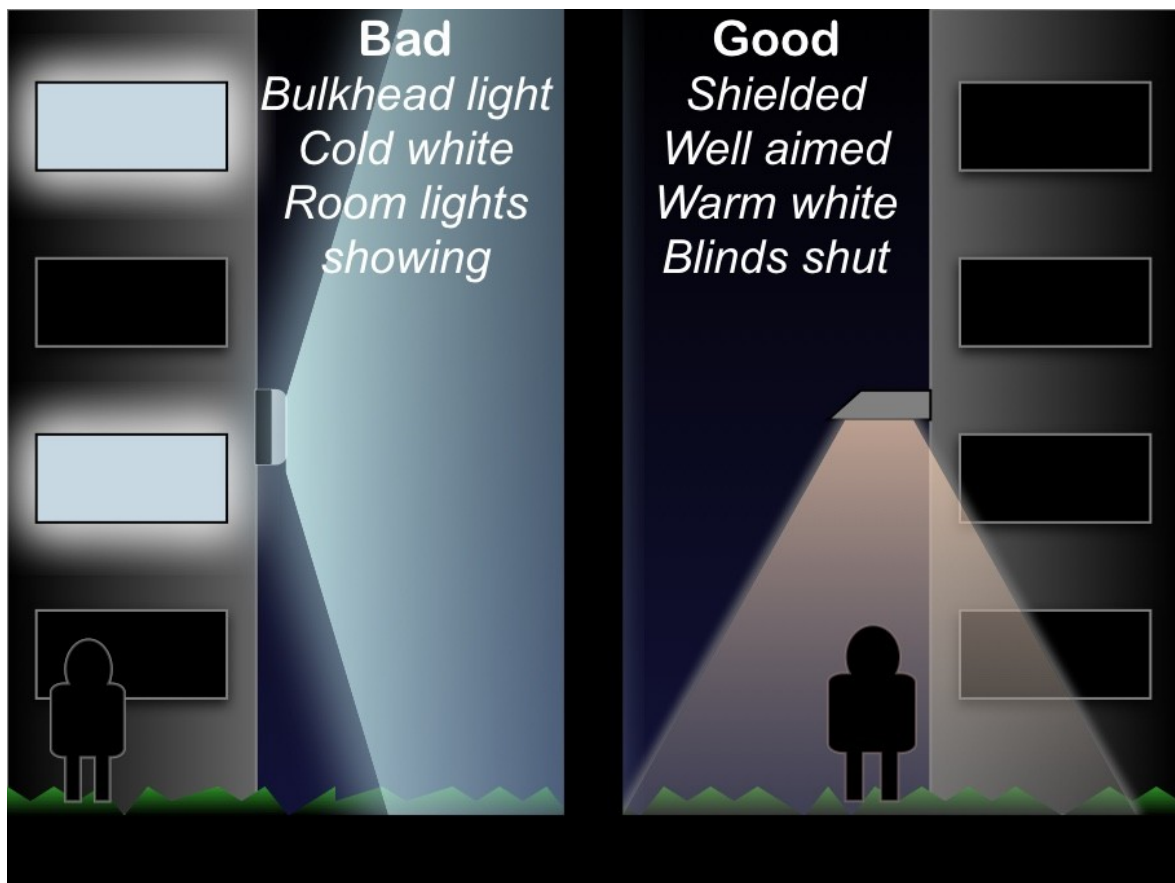
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Commercial exterior lighting

Unshielded bulkhead lighting (wall packs) should be avoided, since the majority of the light actually shines into people's eyes, causing glare which can actually make an area less visible. This is especially dangerous near moving vehicles, and criminals have broken into buildings directly beneath such lights, using the glare to conceal their activity.



For safety, security and economy use shielded bulkhead lighting that **shines light down only where needed**.



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CfDS Recommendations

For greater efficiency and reduced sky-glow:

- ✓ **Luminaire** - modern full cut-off, energy efficient lights, fitted with shields where light intrusion is an issue (1)
- ✓ **Colour** - warm white or amber lights with CCT below 3000K (2)
- ✓ **Adaptive Control** - remotely controllable lighting technology allowing lights to be dimmed or turned off completely if local conditions and policies permit (3)
- ✓ **Brightness** - the minimum luminous intensity consistent with relevant codes of practice involving, for example, maintenance or colour rendering factors
- ✓ **Design** - lighting schemes should be designed by lighting professionals given the brief to minimise stray light into nearby premises, the surrounding countryside and the night sky
- ✓ **Community** - householders and businesses, please use the guidance shown to get star-quality results by taking extra care when installing exterior lighting

Adopting these lighting principles can lead to dramatic decreases in running costs and the amount of light pollution produced. Security can improve and harm to the environment can be reduced. More detailed guidance available on the CfDS website.

Galloway Forest Park Dark Skies - we can all share such beautiful skies if we work together to cut sky-glow
Photo James Hilder



Notes:

- 1) Benefits are mostly local
- 2) Benefits mostly at distance
- 3) Bright lighting levels are simply not needed throughout the night. In a recent experiment in York City Centre, only 5% of respondents to a survey noticed that street-lights had been dimmed. No crimes were reported around the dimmed lights during the trial period.



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